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Original Article

Community Medicine Section

Prevalence of Intestinal Parasitic Infection Among Inhabitants and Tribes of Chelgerd, Iran, 2008-2009

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ABSTRACT

Introduction: Although a notable development in treating and controlling of parasitic infections in recent years has occurred but, these infections are still counted as important problems in many countries.

Aim: The aim of this study is to determine the prevalence of intestinal parasitic infections in the inhabitant and tribe populations who were referred to central health care of Chelgerd, Iran.

Materials and Methods: This descriptive cross-sectional study was carried out from April 2008 to October 2009 in Chelgerd, Iran. A total of 655 samples of feces from inhabitants and tribes were collected and each sample was examined by Direct smear, formol-ethyl acetate concentration and Trichorom staining.

Results: Out of 655 stool samples, 367(56%) patients revealed at least one intestinal parasite (pathogenic /non-pathogenic protozoa/ helminth), 233(67.7%) in tribes and 134(43%) in inhabitants. There was significant difference between infected inhabitants and infected tribes (p=0.001). Although the intestinal parasitic infections were more in female than male it was not statistically significant (p=0.52). There was no significant difference in various age groups. Common intestinal parasitic infections which were detected in both the populations were *Giardia intestinalis* (28.2%) and *Blastocystis hominis* (27.5%).

Conclusions: We found that the prevalence of intestinal parasitic infections was higher in the tribe than inhabitant populations. Prevalence of intestinal protozoa infections was much higher than the helminthic infections. These findings reflect poor sanitary conditions in this region. They should be educated and provided better facilities to get rid of intestinal parasitic infections.

Keywords: Fecal-oral route, Gastrointestinal disorders, Intestinal protozoan parasite

INTRODUCTION

Intestinal parasitic infections are amongst the most common infections worldwide. It is estimated that 450 million are ill as a result of these infections, the majority being children [1,2]. These intestinal parasitic infections are found among people with low socio- economic status and poor hygiene [3,4]. Intestinal parasitic infections considered as major problems of public health in developing countries. In developed countries intestinal protozoan parasites are known as an important cause of gastrointestinal disorders [5], enteric protozoa are one cause of diarrheal disease in children. Intestinal parasitic infections mainly are transmitted by the fecal-oral route [3,6]. Common intestinal parasites such as *Giardia intestinalis (G. intestinalis) and Blastocystis hominis (B. hominis)* are still health challenges of economically developed and developing countries [7,8]. *B hominis* is the most common human intestinal protozoa worldwide. It was associated with diarrhea in the tropics and subtropics, since it was found in patients throughout the world. The reported prevalence rates of intestinal protozoa varied from 1.5% to 10% in developed countries, with much higher rates of 30%to 50% in developing countries [9,10].

Two hundred million intestinal parasitic protozoan occur each year in Africa, Asia and Latin. America [11]. Intestinal parasitic infections especially protozoa are historically common in Iran. Several studies have been conducted on the distribution and prevalence of several intestinal parasitic infections in Iran [12,13]. There are still several regions for which epidemiological information is not available. So, for the first time, we conducted this study to determine the prevalence of intestinal parasitic infections in Chelgerd, Iran.

MATERIALS AND METHODS

Study area: Chelgerd is a township in province of ChaharMahal and Bakhtiari in southwest of Iran. This descriptive cross-sectional type of study was carried out upon the inhabitant and tribe populations with various complaints of gastrointestinal disorders from April 2008 to October 2009 in Chelgerd, Iran. This area is surrounded by the Zagros Mountains. Temperature in spring and summer is temperate and in winter is very cold (0°C-20°C). In spring, tribe societies migrate from Khuzestan province (south of Iran) to Chelgerd city (southwest of Iran).The people who live in this region are generally engaged in animal husbandry and agriculture.

A total of 655 stool samples were studied from April 2008 to October 2009. Stool samples from 311 inhabitants and 344 tribes, who visited Chelgerd central health care, Iran were collected and examined by three parasitological methods in Chelgerd laboratory.

This study was approved by Medical School Council of Isfahan University of medical sciences.

STATISTICAL ANALYSIS

The data were analysed by SPSS software through descriptive statistics, frequency tables, and chi-square test. P-value of less than 0.05 was considered as statistically significant.

Collection of stool samples

Six hundred and fifty five fecal samples were randomly collected in three days. Inclusion criteria in this study were patients with abdominal pain, fever, tenesmus, diarrhea and dysentery .Some of them had only one symptom and some others had more than one symptom. An informed consent form was signed by participants (in cases under 18-year-old, it was signed by their parents).

In order to get more information about intestinal parasitic infections, they were asked to fill out a questionnaire form about age, life style, locality (tribes, inhabitant) and gender. The stool samples which were contaminated with urine or soil were excluded from the study.

Stool examination: Samples were examined microscopically by Direct smear with normal saline and iodine, Formol-ethyl acetate concentration and Trichorom staining methods [14].

RESULTS

A total of 655 stool specimens were examined by three parasitological methods, out of which 367 (56%) samples were positive for intestinal parasites. A total of 134 (43%) out of the 311 stool samples from inhabitants and 233 (67.7%) out of 344 stool samples of tribe populations were positive for at least one intestinal parasite. There was significant difference in intestinal parasitic infections between inhabitants and tribes (p=0.001) [Table/Fig-1].

Out of 655 stool samples were examined, 361(55.1%) samples revealed intestinal protozoan parasite and 6(0.9%) showed helminth eggs. The overall prevalence of intestinal protozoan infections in both of the populations was due to *G. intestinalis* (28.2%) and *B. hominis* (27.5 %) [Table/Fig-2].

[Table/Fig-3] shows the prevalence of intestinal protozoan infections among all the patients by gender. Although, the infection was more frequent in females than males, it was no statistically significant (p=0.523). The highest infection rate of intestinal parasites was in the 0-9 years old age group (18.9%) and the lowest infection rate was in the 50-59 y age group (0.6%).There is no statistically significant difference between them (p>0.05) [Table/Fig-4].

Ethnic group	Total no.	Positive no.	p-value
Inhabitant	311	134	p=0.001
Tribe	344	233	
Total	655	367	

[Table/Fig-1]: Prevalence of intestinal parasitic infections among the inhabitants and tribes of Chelgerd city, Iran, 2008-2009

Type of intestinal protozoan parasites	Infective Tribes n(%)	Infective Inhabitant n(%)	Total n(%)
G.intestinalis	107(31.1)	78(25.1)	185(28.2)
B. hominis	121(35.2)	59(19)	180(27.5)
E. nana	66(19.2)	31(10.0)	97(14.8)
E. coli	52(15.1)	22(7.1)	74(11.3)
I. butchlii	23(6.7)	8(2.6)	31(4.7)
E. histolytica/ E. dispar	8(2.3)	3(1)	11(1.7)
C. mesnili	3(0.9)	1(0.3)	4(0.6)

[Table/Fig-2]: Distribution of intestinal protozoa infections among the inhabitants and tribes of Chelgerd city, Iran, 2008-2009

Sex	Total no.	Infective no.	p-value
Male	310	163	p=0.523
Female	345	204	
Total	655	367	

[Table/Fig-3]: Prevalence of intestinal parasitic infections among male and female in the inhabitants and tribes of Chelgerd city, Iran, 2008-2009

Age	Non-infective	Infective	Total percent of infective Patient
9-0	92	124	18.9%
19-10	86	102	15.5%
29-20	65	59	9%
39-30	39	58	8.8%
49-40	15	21	3.2%
59-50	4	3	0.6%
69-60	1	0	0
total	302	367	56%

[Table/Fig-4]: Prevalence of intestinal parasitic infections by age groups among the inhabitants and tribes of Chelgerd city, Iran, 2008-2009

Multiple infections (polyparasitism) occurred in 158 individuals (24.1%). Among all the subjects, frequency of Double infection was 104 (15.87%), and that of triple infection was 43 (6.56%) and those of more than three infection was 11(1.67%) [Table/Fig-5].

Parasitic infection	Frequency	Percent%
Double infection	104	15.87
Triple infection	43	6.56
More than 3 species of parasites	11	1.67
Total	158	24.1

[Table/Fig-5]: Frequency of co-infection with more than 1 species of parasite among the inhabitants and tribes of Chelgerd city, Iran, 2008-2009

DISCUSSION

Intestinal parasitic infections of humans are major health problem in many tropical and sub-tropical areas of the world, especially in the developing countries such as Iran. Several epidemiological studies have been conducted to determine the prevalence rate of intestinal parasite infections in Iran [15-18]. Patterns of intestinal parasitic infections in the population, may have changed because of socio- demographic characteristic, life style, human behaviour, nutritional habituate and sanitary/ hygiene improvements [15,19,20]. Prevalence of intestinal parasites varies in different parts of Iran, with 61% reported from Yazd (central of Iran), 56.6% in Ghazvin (North of Iran) and 46.7% in Ilam (West of Iran) [21].

Prevalence of intestinal parasitic infections in this area hasn't clearly been determined, so the study was conducted to determine the prevalence of intestinal parasitic infections in this part of Iran, for the first time. The present study revealed that the tribe populations had a higher prevalence of intestinal parasitic infections (67.7%) as compared to the inhabitant population (43%). This finding was in agreement with the findings of KD et al., [22].

Out of 655 patients who were studied, 361(55.1%) are infected with at least one species of intestinal protozoa and 6(0.9%) patients infected with helminth. Relatively low incidences of helminthic infections achieved in this study, is in accordance with the fact that the prevalence of intestinal helmints appear generally to become rarer in Iran and we only found *Hymenolepis nana* in 6 (0.9%)of the examined samples [20]. This contradiction is due to this fact that intestinal protozoa cysts are more easily transmissible from one person to another one than helminthes. Intestinal protozoa cysts are more resistant to disinfectant agents and unfavorable conditions than helminth eggs and larva. In this study, 9 species of intestinal pathogenic and non-pathogenic protozoa were detected and they were as follow: *Giardia intestinalis* 185(28.2%), *Blastocystis hominis* 180 (27.5%), *Endolimax nana* 97(14.8%), *Entamoeba coli* 74 (11.3%), *Iodamoeba butschlii* 31(4.7%), *Entamoeba histolytica/ E. dispar* 11(1.7%). They are major public health concern in both populations.

The highest infection rates of intestinal pathogenic protozoan were due to *Giardia intestinalis* followed by *Blastocystis hominis*. The findings of this study show a trend of high risk infections of intestinal protozoan among these populations especially in tribes as shown by other studies [15,19-21].

Public health interest in *Giardia intestinalis* is increasing because of the growing recognition of its role as a cause of disease outbreak. It is the most common infection throughout countries with temperate and tropical climate. The prevalence rate of Giardiasis was 2-5% in developed countries and 20-30% in developing countries [23].

A similar study carried out by Arani et al., showed the prevalence of intestinal parasites in a population in south of Tehran. Out of 4371 participants, 466(10.7%) were infected with at least one intestinal parasites. The most prevalent parasites were *Blastocystis hominis* and *Giardia intestinalis* [21].

During 2004-2005, a study in rural population of Mazandaran Province, northern Iran, was carried out to achieve the profiles of distribution of intestinal protozoan parasites. .The results showed that *Giardia intestinalis* (10.2%) and *Blastocystis hominis* (9.8%) were the most frequent intestinal protozoan parasites [12].

The most prevalent intestinal protozoa parasites in 228 school attending children of Isfahan, Iran was due to *Giardia intestinalis* (19.3%) [24]. A similar study in Thailand on guardian-less children showed that the prevalence of *Giardia intestinalis* was 37.7% [25]. A study was conducted in Libya to determine the prevalence and clinical features of *Blastocystishominis* infection among patients in Sebha. *B. hominis* was found in 969 (26.58 %) of 3645 stool specimens examined [26].

In the present study, the highest infection rate was found in children between 0-9 years old compared to other age groups while there was a reduction in infection as age increased. It could be due to higher awareness in observing personal hygiene measures between older age group. Some studies proved that the infection rate in children (under-15) increased with age and there is no statistical significance between genders [19].

In this population, female do a lot of works such as household, animal husbandry and agriculture. Although the infection rate was more frequent in females than males, there was no significant difference in prevalence of intestinal parasitic infections between males and females (p=0.5).

In this study, 24.1% of the total examined subjects have co-infection with more than 1 species of intestinal parasites. These results show that the rate of intestinal parasitic infections is high in these populations. This is similar to a study done in Argentina portraying a polyparasitism of 61.6% among marginally poor people [27]. This finding is consistent with a study done among urban dwellers in southwest Ethiopia. Multiple infections (polyparasitism) occurred in 515 individuals making 56.7% of the total examined subjects and 68.3% of those who had intestinal parasites. Double infection was frequently seen in more than one third (35.8%) among Ethiopian subjects [28].

Personal hygiene among these aboriginal populations especially in tribes is poor. The children in this region tend to have special habits such as not washing hands before and after eating, consuming raw food especially fruits without washing them, play on soil and defecating on it. These habits are also common among adults. They are some factors for high prevalence of intestinal protozoa especially in tribes. In this region, tribes are tent-dweller and because of this, they have no easy and hygienic place for the disposal human excreta and they do not access to hygienic facilities. They never use toilet and latrines and indiscriminate defecation which spreads parasites in the immediate environment (soil, courtyard).In addition, the flowing of sewage into rivers can cause water contamination.

Based on our observations, we found that although the government provided piped water from the river for inhabitants. Sometimes water contaminated with sewage and people who drink it, will become infected. It actually happens because water distribution system in this region is very old and pipe break commonly occur and consequently sewage and soil penetrate into water and it can cause water contamination.

CONCLUSION

The high prevalence of intestinal parasitic infections in the area under study indicated that much work remains to be done to improve the health of the people. Screening and treatment of infected people as well as improving sanitation and supplying treated water will lower the infection rates. Aborigine people especially children, should be educated about environmental and personal hygiene.

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